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Water

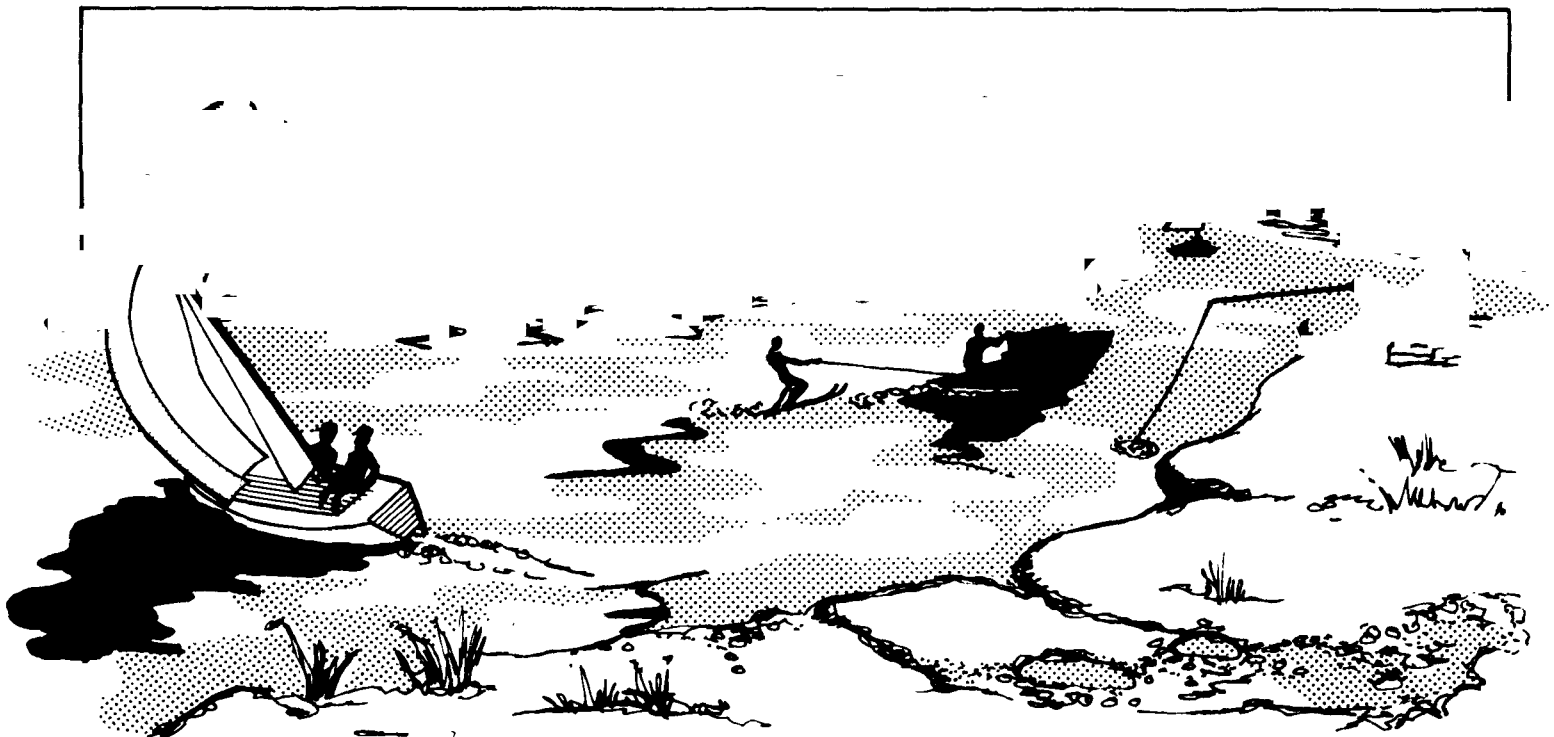
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# Phosphorus

810R80101

## Water Quality Standards Criteria Summaries A Compilation of State/Federal Criteria



PHOSPHORUS

Water Quality Standards  
Criteria Summaries  
A Compilation of State/Federal Criteria

September 1980

U. S. Environmental Protection Agency  
Office of Water Regulations and Standards  
Washington, D. C. 20460

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U.S. Environmental Protection Agency

NATIONAL SUMMARY  
OF  
STATE WATER QUALITY STANDARDS

PHOSPHORUS

SEPTEMBER, 1980

PREPARED FOR  
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CRITERIA AND STANDARDS DIVISION  
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## INTRODUCTION

This digest is compiled to provide general information to the public as well as to Federal, State, and local officials. It contains excerpts from the individual Federal-State water quality standards establishing pollutant specific criteria for interstate surface waters. The water quality standards program is implemented by the U. S. Environmental Protection Agency where responsibility for providing water quality recommendations, approving State-adopted standards for interstate waters, evaluating adherence to the standards, and overseeing enforcement of standards compliance, has been mandated by Congress.

Standards, a nationwide strategy for surface water quality management, contain three major elements: the use (recreation, drinking water, fish and wildlife propagation, industrial, or agricultural) to be made of the navigable water; criteria to protect these uses; and an antidegradation statement to protect existing high quality waters, from degradation by the addition of pollutants.

Water quality criteria (numerical or narrative specifications) for physical, chemical, temperature, and biological constituents are stated in the July 1976 U. S. Environmental Protection Agency publication Quality Criteria for Water (QCW), available from the Government Printing Office, Washington, D. C. The 1976 QCW, commonly referred to as the "Red Book," is the most current compilation of scientific information used by the Agency as a basis for assessing water quality. This publication is subject to periodic updating and revisions in light of new scientific and technical information.

Criteria for phosphorus in State water quality standards are the subject of this digest. Phosphorus criteria for water are established to provide a threshold level which when exceeded would most likely result in aquatic life toxicity, due to elemental phosphorus, and excessive aquatic plant growth, caused by phosphate phosphorus which is an essential plant nutrient. Phosphorus and phosphates usually enter a waterbody from land runoff, human and animal excreta, decaying vegetation, and industrial processes and detergents. Once combined with other nutrients in a waterbody, their removal becomes tedious and expensive. The 1976 Quality Criteria for Water recommends a phosphorus criterion of:

0.10 ug/l yellow (elemental) phosphorus for marine and estuarine waters.

There is no freshwater criterion.

Since water quality standards experience revisions and upgrading from time to time, following procedures set forth in the Clean Water Act, individual entries in this digest may be superseded. As these revisions are accomplished and allowing for the States to revise their standards accordingly, this digest will be updated and

reissued. Because this publication is not intended for use other than as a general information resource, to obtain the latest information and for special purposes and applications, the reader needs to refer to the current approved water quality standards. These can be obtained from the State water pollution control agencies or the EPA or Regional Offices.

Individual State-adopted criteria follow:

## REFERENCES

- A California Water Quality Standards by River Basins, c.a. 1975  
For more detailed information on selected basins, sub-basins and stretches of streams and coastal areas refer to California State Water Quality Standards.
- B Delaware Water Quality Standards, March 25, 1979
- C Idaho Water Quality Standards, c.a. September, 1979
- D Missouri Water Quality Standards, c.a. February, 1978
- E American Samoa Water Quality Standards,  
Revised July, 1973
- F Territory of Guam Water Quality Standards, Sept. 1975
- G Trust Territory of the Pacific Islands Water Quality  
Standards, October 21, 1973
- H Virgin Islands Water Quality Standards, Aug. 1973

ENVIRONMENT REPORTER, The Bureau of National Affairs, Inc.  
Washington, D. C. 20037

- 1 Pages 701:0501-0509, February 16, 1979
- 2 Pages 706:1004-1008, July 20, 1979
- 3 Pages 711:0542-0544, August 5, 1977
- 4 Pages 716:0603, March 26, 1976
- 5 Pages 726:1005, 1011-1013, March 7, 1980  
Basic Water Quality Standards adopted May 22, 1979,  
have not yet been submitted to EPA for formal approval.
- 6 Pages 731:1002-1009, September 8, 1978
- 7 Pages 746:1008-1014, October 19, 1979
- 8 Pages 751:0504-0505, January 25, 1980
- 9 Pages 765:0512-0515, January 30, 1976
- 10 Page 761:0503-0504, 1973

- 11 Page 766:0504-0509, October 5, 1979
- 12 Pages 771:0502-0504, September 29, 1978
- 13 Pages 776:0504-0506, April 10, 1979
- 14 Pages 781:0501-0502, May 18, 1979
- 15 Pages 786:0501-0502, August 29, 1975
- 16 Page 791:0583, May 26, 1978
- 17 Pages 796:0103-0108, February 16, 1979
- 18 Pages 801:1001-1002, Sept. 29, 1978
- 19 Page 806:1003, March 30, 1979
- 20 Page 811:1043, 1974
- 21 Pages 816:0602-0607, 0642-0648, 1974
- 22 Pages 821:0502-0505, June 30, 1978
- 23 Pages 831:0501-0510, February 21, 1975
- 24 Page 836:0502, June 30, 1978
- 25 Pages 841:0507-0537, December 7, 1979
- 26 Pages 846:0501-0508, November 17, 1978
- 27 Pages 851:1001-1023, December 15, 1978
- 28 Pages 856:1001-1002, July 18, 1978
- 29 Pages 861:1002-1007, August 11, 1979
- 30 Pages 866:1004-1009, December 28, 1979
- 31 Pages 871:0501-0506, November 25, 1977
- 32 Pages 876:1001-1043, May 26, 1978
- 33 Pages 881:1001-1007, September 21, 1979
- 34 Pages 886:0513-0524, August 29, 1975
- 35 Pages 891:1001-1129, November 16, 1979



- 36 Pages 901:0501-0505, November 3, 1978
- 37 Pages 906:0501-0506, October 13, 1978
- 38 Pages 911:0501-0507, June 22, 1979
- 39 Pages 916:0541-0544, April 14, 1978
- 40 Pages 921:1001-1003, August 13, 1976
- 41 Pages 926:0541-0563, January 26, 1979
- 42 Pages 931:0501-0508, May 26, 1978
- 43 Pages 936:1001-1003, June 27, 1975
- 44 Pages 941:1001-1005, May 26, 1978
- 45 Pages 946:0501-0520, July 14, 1978
- 46 Pages 951:1002-1003, April 28, 1978
- 47 Pages 956:1001-1007, January 11, 1980
- 48 Page 741:1002, November 23, 1979
- 49 Pages 896:0301-0310, March 31, 1978

## PHOSPHORUS

<u>State</u>	<u>Criteria Value in mg/l</u>	<u>Designated Stream Use</u>
Alabama <sup>1</sup>	Not specified	All
Alaska <sup>2</sup>	Not specified	All
Arizona <sup>3</sup>	<p>The mean annual total phosphate concentrations of the following waters shall not exceed the values given below nor shall the total phosphate or total nitrate concentrations of more than 10 percent of the samples in any year exceed the 90 percent values given below. Unless otherwise specified, indicated values also apply to tributaries to the named waters.</p> <p>Total phosphates as PO<sub>4</sub>mg/l</p>	
	0.04 Mean annual 0.06 90 pct-value	Colorado River from Utah border to Willow Beach (main stem)
	0.06 Mean annual 0.10 90 pct-value	Colorado River from Willow Beach to Parker Dam (main stem)
	0.08 Mean annual 0.12 90 pct-value	Colorado River from Parker Dam to Imperial Dam (main stem)
	0.10 Mean annual 0.15 90 pct-value	Colorado River from Imperial Dam to Morelos Dam (main stem)
	0.50 Mean annual 0.80 90 pct-value	Gila River from New Mexico border to San Carlos Reservoir (excluding San Carlos Reservoir)
	0.30 Mean annual 0.50 90 pct-value	Gila River from San Carlos Reservoir to Ashurst Hayden Dam (including San Carlos Reservoir)

<u>State</u>	<u>Criteria Value</u>	<u>Designated Stream Use</u>
Arizona (con't)	0.30 Annual mean 0.50 90 pct-value	San Pedro River
	0.20 Annual mean 0.30 90 pct-value	Verde River (except Granite Creek)
	0.20 Mean annual 0.30 90 pct-value	Salt River above Roosevelt Lake
	0.50 Mean annual 0.80 90 pct-value	Santa Cruz River from international boundary near Nogales to Sahuarita
	0.30 Mean annual 0.50 90 pct-value	Little Colorado River above Lyman Reservoir

The above standards are intended to protect the beneficial uses of the named waters. Because regulation of nitrates and phosphates alone may not be adequate to protect waters from eutrophication, no substance shall be added to any surface water which produces aquatic growth to the extent that such growths create a public nuisance or interference with beneficial uses of the water defined and designated in Reg. 6-2-65.

Federally promulgated in June, 1976.

Arkansas <sup>4</sup>	The naturally occurring nitrogen/phosphorus ratio shall not be significantly altered due to municipal, industrial, agricultural or other waste discharges, nor shall total phosphorus exceed 100 ug/l in streams or 50 ug/l in lakes and reservoirs due to any such discharges.	All
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California <sup>A</sup>	Concentration not to be exceeded: (Total Phosphorus)	
	0.2 mg/l	Marine habitat, warm freshwater habitat (Basin 3)
	0.1 mg/l	Cold freshwater habitat, fish spawning (Basin 3)
	0.05 mg/l	Water contact recreation or non-contact water recreation (Basin 3)

<u>State</u>	<u>Criteria Value</u>	<u>Designated Stream Use</u>
Colorado <sup>5</sup>	Not specified	All
Connecticut <sup>6</sup>	None other than of natural origin  There shall be no point source discharge into any natural lake or pond or tributary surface waters which will raise the phosphorus concentration, of the receiving surface waters, including phosphorus contained in suspended matter to an amount in excess of 0.03 mg/l.	Drinking water supply  Recreation, agricultural, industrial, fish, and wildlife habitat
Delaware <sup>B</sup>	Not specified	All
Florida <sup>7</sup>	0.0001(Elemental)	Shellfish harvesting recreation, fish and wildlife
Georgia <sup>8</sup>	Not specified	All
Hawaii <sup>9</sup>	Total phosphorus, not greater than 0.020 mg/l	Class AA
	Not greater than 0.025 mg/l	Class A
	Not greater than 0.030 mg/l	Class B
	Not greater than 0.20 mg/l except not greater than 0.05 mg/l for waters entering lakes or reservoirs.	Classes 1 and 2
Idaho <sup>10</sup>	Not specified	All
Illinois <sup>11</sup>	After December 31, 1983, phosphorus as P shall not exceed 0.05 mg/l in any reservoir or lake with a surface area of 20 acres or more, or in any stream at the point where it enters any such reservoir or lake. For the purposes of this Rule (203C) the term 'reservoir or lake' shall not include low level pools constructed in free flowing streams or any body of water which is an integral part of an operation	All, except Lake Michigan

<u>State</u>	<u>Criteria Value</u>	<u>Designated Stream Use</u>
Illinois (con't)	which includes the application of sludge on land. Point source discharges which comply with Rule 407 of this Chapter shall be in compliance with this Rule 203(c) for purposes of the application of Rule 402 of this chapter.	
	0.007	All Lake Michigan
Indiana <sup>12</sup>	0.03 mg/1 monthly average	Inner Harbor
	0.04 mg/1 daily average	Gary Harbor, Burns Harbor, and Lake Michigan
	0.1 mg/1 Maximum value, except in waters flowing westward into Illinois.	Grand Calumet River and Indiana Harbor Ship Canal
	0.04 mg/1 (total phosphorus)	Wolf Lake and Wolf Lake Channel
	Free from substances attributable to municipal, industrial, agricultural or other sources in concentrations or combinations which will cause or contribute to the growth of aquatic plants or algae in such degree as to create a nuisance, be unsightly or deleterious, or be harmful to salmonid fishes or the natural biota.	Natural spawning, rearing or imprinting areas, and migration route for Salmonid Fishes.
Iowa <sup>13</sup>	Not specified	All
Kansas <sup>14</sup>	Not specified	All
Kentucky <sup>15</sup>	Not specified	All
Louisiana <sup>16</sup>	Not specified	All
	Nutrients: The naturally occurring nitrogen-phosphorous ratio shall be maintained. On completion of detailed studies on the naturally occurring levels of the various macro and micro nutrients the state will establish numerical limits on nutrients where possible.	All

<u>State</u>	<u>Criteria Value</u>	<u>Designated Stream Use</u>
Maine <sup>17</sup>	Total phosphorus shall not exceed 15 parts per billion	GP-A
	The total phosphorus concentration shall not exceed 50 parts per billion at measured in samples taken at or near the surface of the water.	GP-B
Maryland <sup>18</sup>	The state recognizes that certain waters of the State are eutrophic or are approaching eutrophic conditions. All discharges to waters which are eutrophic or potentially eutrophic, when so identified by the State, shall be treated as necessary to reduce eutrophic effects. The State shall require that wastewaters, containing nutrients which cause or may cause eutrophication be given advanced waste treatment prior to discharge, or be disposed of by spray irrigation on land, or by other practicable procedures which will avoid direct discharge to surface waters.	
Massachusetts <sup>19</sup>	The discharge of nutrients, primarily phosphorus or nitrogen, to waters of the Commonwealth will be limited or prohibited by the Division as necessary to prevent excessive eutrophication of such waters. There shall be no new or increased discharges of nutrients into lakes and ponds, or tributaries thereto. Existing discharges containing nutrients which encourage eutrophication or growth of weeds or algae shall be treated. Activities which may result in non-point discharges of nutrients shall be conducted in accordance with the best management practices reasonably determined by the Division to be necessary to preclude or minimize such discharges of nutrients.	All
Michigan <sup>20</sup>	1.0 (monthly average effluent concentration goal)	All
Minnesota <sup>21</sup>	The standards provide for an effluent limit of 1.0 mg/l where the effluent affects a lake or reservoir.	All

<u>State</u>	<u>Criteria Value</u>	<u>Designated Stream Use</u>
Mississippi <sup>22</sup>	Not specified	All
Missouri <sup>D</sup>	Not specified	All
Montana <sup>23</sup>	Not specified	All
Nebraska <sup>24</sup>	Not specified	All
Nevada <sup>25</sup>	Total phosphate shall not exceed 0.15 in any stream at the point where it enters any reservoir or lake, nor 0.075 in any reservoir or lake, nor 0.30 in streams and other flowing waters.	Drinking water supply with treatment by disinfection only suitable for aquatic life habitat, wildlife propagation, agricultural use, recreation, boating and esthetics.
	Total phosphates shall not exceed 0.3	Drinking water supply with treatment by disinfection and filtration only, for agricultural use, aquatic life and wildlife propagation, recreation, industrial supply and esthetics
	Total phosphates shall not exceed 1.0	Domestic water supply following complete treatment, agricultural use, aquatic life, wildlife propagation, recreation, and industrial supply
	See Nevada State Water Quality Criteria Compilation 1979, for specific stretches of stream.	
New Hampshire <sup>26</sup>	None, except as naturally occurs	Water supply (after disinfection)
	None in such concentrations (generally less than 0.015 ppm) that would impair any usages assigned to this class unless naturally occurring	All, except water supply (after disinfection)

<u>State</u>	<u>Criteria Value</u>	<u>Designated Stream Use</u>
New Hampshire (con't)	There shall be no phosphorus in such concentrations that would impair any usages assigned to the specific class involved. Where treatment to remove phosphorus is required under this regulation such treatment shall remove phosphorus to the maximum extent technically feasible.	All
	In all lakes and ponds: There shall be no new point discharge of wastewater containing phosphorus. In addition there shall be no new discharge of wastewater containing phosphorus to tributaries of lakes or ponds that would encourage eutrophication or growth of weeds or algae in such lakes and ponds.	All
	Any point discharge of wastewater existing as of the date of adoption of these rules and regulations and containing phosphates in concentrations which encourage eutrophication or growth of weeds or algae, shall be treated to remove such phosphates to the maximum extent technically feasible.	All
	The preceding shall not apply to any condition due to natural causes.	
New Jersey <sup>27</sup>	Phosphorus as total P shall not exceed 50 ug/l in any reservoir, lake, pond or in a tributary at the point where it enters such bodies of water, unless it can be demonstrated that total P is not a limiting factor considering the morphological, physical, chemical and other characteristics of the water body.	Fresh, non-tidal designated for public water supply, biota, recreation, industrial, agricultural, and any other reasonable use.
	Phosphorus at total P shall not exceed 50 mg/l in any reservoir, lake, pond or in a tributary at the point where it enters such bodies of water, unless it can be demonstrated that total P is not a limiting factor considering the morphological, physical, chemical and other characteristics of the water body.	Fresh, non-tidal designated for natural biota, recreation, industrial, agricultural, and any other reasonable use.
	0.7	All uses in central Pine Barrens



<u>State</u>	<u>Criteria Value</u>	<u>Designated Stream Use</u>
New Mexico <sup>28</sup>	Not specified	All
New York <sup>29</sup>	Concentration should be limited to the extent necessary to prevent nuisance growths of algae, weeds and slimes that are or may become injurious to any beneficial water use.	All uses of International boundary waters
North Carolina <sup>30</sup>	0.0001 (Elemental)	All
North Dakota <sup>31</sup>	0.1 - 0.2 depending upon type of drinking water treatment process utilized	All
	0.025 (goal)	All lake uses
Ohio <sup>32</sup>	Total phosphorus as P shall be limited to the extent necessary to prevent nuisance growths of algae, weeds, and slimes that result in a violation of the water quality standards set forth in Chapter 3745-1 of the Ohio Administrative Code. In areas where such nuisance growths exist, phosphorus discharges from point sources determined significant by the Ohio Environmental Protection Agency shall not exceed a daily average of one milligram per liter as total P, or such stricter requirements as may be imposed by Ohio EPA in accordance with the International Joint Commission (US-Canada agreement)	Warmwater habitat, exceptional warm water habitat, seasonal warm water habitat, limited warm water habitat (with specific exceptions), cold water habitat, and Lake Erie.
Oklahoma <sup>33</sup>	Not specified	All
	The total phosphorus concentration and the nitrogen/phosphorous concentration ratio shall be limited to present eutrophication problems.	All
	Where historical data on nitrogen and phosphorus does not exist, sample points upstream of the point of discharge shall be used to calculate the natural nitrogen/phosphorus concentration ratio. The application of this standard shall be determined on a case by case basis. Compliance with this standard shall be determined at the end of the mixing zone.	

<u>State</u>	<u>Criteria Value</u>	<u>Designated Stream Use</u>
Oregon <sup>34</sup>	Not specified	All
Pennsylvania <sup>35</sup>	P <sub>1</sub> 0.03 P <sub>2</sub> 0.10 P <sub>3</sub> 0.13	See Drainage Lists A through E of Pennsylvania Water Quality Standards for applicable uses and streams
Rhode Island <sup>36</sup>	None in such concentration that would impair any usages specifically assigned to said Class. New discharges of wastes containing phosphates will not be permitted into or immediately upstream of lakes or ponds. Phosphates shall be removed from existing discharges to the extent that such removal is or may become technically and reasonably feasible.	All
South Carolina <sup>37</sup>	Not specified	All
South Dakota <sup>38</sup>	Not specified	All
Tennessee <sup>39</sup>	Not specified	All
Texas <sup>40</sup>	Not specified	All
Utah <sup>41</sup>	0.05  0.025	Recreation, aesthetics, aquatic life  All uses in lakes and reservoirs
Vermont <sup>42</sup>	There shall be no discharge of wastes to Class A waters that do not meet or exceed the technical and other requirements for such waters nor shall there be any discharge of wastes containing any form of nutrients which would encourage - eutrophication or growth of weeds or algae.	All

<u>State</u>	<u>Criteria Value</u>	<u>Designated Stream Use</u>
Vermont (con't)	There shall be no new or increased discharge of wastes after May 27, 1971 containing any form of nutrients which would encourage eutrophication or growth of weeds and algae in any lake, pond or reservoir. Any discharge of wastes existing prior to May 27, 1971 containing soluble or other nutrients which would encourage eutrophication or growth of weeds and algae in any lake, pond, or reservoir shall receive the highest practical degree of treatment currently available to remove such nutrients.	
Virginia <sup>43</sup>	In impounded waters, the total phosphate as phosphorus (P) should not exceed 50 ug/1 in any stream where it enters a lake or reservoir nor 25/ug/1 within the lake or reservoir.	Class I, II, III, IV, V, and VI waters
Washington <sup>44</sup>	Not specified	All
West Virginia <sup>45</sup>	Not specified	All
Wisconsin <sup>46</sup>	Not specified	All
Wyoming <sup>47</sup>	Not specified	All
American Samoa <sup>E</sup>	Not specified	All
	The naturally occurring atomic ratio of NO <sub>3</sub> -N to PO <sub>4</sub> -P in a body of water will be <sup>3</sup> / <sub>4</sub> maintained. Similarly, the ratio of inorganic phosphorus (orthophosphate) to total phosphorus (the sum of inorganic phosphorus, dissolved organic phosphorus, and particulate (phosphorus) will be maintained in the ratio and amount as it occurs in the receiving waters naturally.	Recreation, aquatic life
District of Columbia <sup>48</sup>	Not specified	All

<u>State</u>	<u>Criteria Value</u>	<u>Designated Stream Use</u>
Guam <sup>F</sup>	Total phosphorus shall not exceed 0.025 mg/l	AA
	Total phosphorus shall not exceed 0.05 mg/l	A, 2b, I, 2b, II, C
	Total phosphorus shall not exceed 0.10 mg/l	2a-I, 2a-II
Puerto Rico <sup>49</sup>	0.025	All fresh water uses and preservation of coastal water natural phenomena
Trust Territories <sup>G</sup>	0.025	Drinking water supply
	The naturally occurring ratio of the con- centrations of nitrogen to phosphorus will be maintained in all waters.	All
Virgin Islands <sup>H</sup>	0.050	All except preservation of natural phenomena

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